



City of Santa Barbara
Parks and Recreation Department

Memorandum

DATE: February 10, 2010

TO: Creeks Restoration/Water Quality Improvement Program
Citizen Advisory Committee

FROM: George Johnson, Creeks Supervisor

SUBJECT: **MISSION CREEK STEELHEAD PASSAGE PROJECTS**

COMMITTEE DIRECTION – FOR DISCUSSION

Receive a presentation on the proposed steelhead passage projects on Mission Creek.

DISCUSSION

Natural History

The steelhead trout is a remarkable trout species that lives in both freshwater and ocean environments. Steelhead trout are born in freshwater streams/rivers. They typically spend their first year in freshwater habitats and then migrate to the ocean where they spend most of their adult life. Adult steelhead trout are anadromous, meaning they migrate up freshwater streams and rivers to spawn. Steelhead can spawn at any time of year in which adequate flows exist within the stream or river (Stoecker 2002). In Southern California, this occurs during the winter and spring months. Steelhead are capable of several spawning runs during their lifetime, unlike salmon, which spawn once and die.

Steelhead trout are native to streams and rivers along the Pacific Coast from Mexico to Alaska. Populations of southern steelhead historically existed in all of the larger watersheds within Santa Barbara County (Stoecker 2002). The Santa Ynez River is reported to have had the largest population of steelhead in all of Southern California with estimates of 13,000 to 25,000 adults returning in the 1943-1944 run (Titus 1994). Steelhead also inhabited many of the smaller coastal watersheds in Southern Santa Barbara County. Historic estimates of adult steelhead run size do not exist for these smaller streams, but their combined annual run size was likely in the thousands (Stoecker 2002).

The current distribution of steelhead trout extends from Alaska to northern Baja (Stoecker 2002). Although the range of the steelhead is still very large, populations in the southern portion of their range have been severely reduced. Since the beginning of the century it is estimated that steelhead populations in Southern California have been reduced to less than one percent of their former population size (Stoecker 2002). Due to the significant reduction, the Southern California steelhead trout population (which includes Santa Barbara County) has been federally designated as an endangered species by the National Marine Fisheries Service.

Reduction in steelhead trout populations can be attributed to two primary factors: migration barriers and loss of spawning/rearing habitat. Migration barriers are probably the largest threat to steelhead trout populations. Steelhead trout need to swim upstream in order to reach suitable spawning habitat. Upstream migration is limited by water depth, flow rates, and jump heights. Construction of roads, bridges, dams, flood control channels, and other structures in creeks and rivers has radically modified the stream channels and created conditions such as shallow (less than 12 inches) fast moving (over 8 feet per second) water and large jump heights (6-10 feet) that are not favorable to steelhead trout upstream migration. These structures often block access to the highest quality steelhead spawning habitat in the upper watersheds. Removing the barriers to migration is probably the single most important action that can be taken to restore steelhead trout populations within Southern California.

Steelhead trout have very specific habitat requirements for successful spawning and rearing. The trout need clear, cool, good quality water for spawning. They also need pools with clean gravel beds and adequate depth and size for making redds (nests). The streams must include riffle habitat as well as good quality substrate for a healthy macroinvertebrate population (bugs for food). In Santa Barbara County, these conditions are mostly located within the mid to upper sections of the stream channels. Urbanization, including roads and water diversions, has degraded water quality in many streams and rivers. Urbanization has also modified the stream morphology (shape) and substrate making some portions of the streams unusable for spawning. Coastal estuaries and lagoons are also important for steelhead rearing. Many have been drained or filled for urbanization limiting the available habitat for steelhead.

Project Purpose

Mission Creek is considered the most viable stream for steelhead trout restoration within the City of Santa Barbara. Mission Creek has an existing population of rainbow trout, contains high quality spawning and rearing habitat within the stream channels in the mid and upper watershed, and has a documented historic run of steelhead trout. Five of the last six years, the federally endangered Southern California steelhead trout have been observed attempting to migrate and spawn within the lower section of Mission Creek. During the winter of 2007/2008 six steelhead trout over 16 inches were documented in the lower section of Mission Creek.

Although steelhead trout are frequently seen in Mission Creek, they are unable to migrate upstream and spawn due to barriers within the creek channel. Currently, there are 12 significant anthropogenic barriers to steelhead trout migration on Mission Creek. The most significant barrier, within the lower stream channel, is at the Caltrans Channels. Two smaller barriers also exist within the lower to mid stream channel at the Tallant Road Bridge and the Highway 192 Bridge. The City is currently working to remove all three barriers.

The primary goal of the proposed projects is to improve upstream migration of the endangered steelhead trout in order to provide access to their historic spawning grounds. Without modifications of these barriers, steelhead will not be able to migrate and spawn within Mission Creek and will continue dying in the pools within the lower watershed during unsuccessful spawning attempts. If this situation is not corrected soon, it could ultimately lead to extirpation of this species from Mission Creek and other South Coast Streams.

The proposed fish passage projects on Mission Creek would modify the stream channel to allow steelhead trout the ability to freely migrate between the ocean and spawning habitat within the mid and upper stream channel. Removing these barriers would provide access for steelhead trout to 3.9 miles of creek channel, which include 2 miles of moderate to high quality spawning and rearing habitat (Stoecker 2002). The following discussion outlines the current status of each of the three fish passage projects on Mission Creek.

Caltrans Channels

Location

The proposed project is located within two concrete lined flood control channels, known as the “Caltrans Channels”. The upstream channel is approximately 0.3 miles long, extending between Los Olivos and Pedregosa Streets, and the downstream channel is approximately 0.8 miles long, extending between Arrellaga and Canon Perdido Streets. The upstream and downstream channels are separated by a 0.4 mile long natural section extending between Pedregosa and Arrellaga Streets. The channels were constructed in 1934 and 1961 respectively, by the California Department of Transportation (Caltrans) to improve flood control along Highway 101.

Background

For the last five years, the Creeks Division has been working with the Flood Control District (FCD), Environmental Defense Center (EDC), California Department of Fish and Game (DFG), NOAA, and others to develop a fish (steelhead trout) passage project at the Caltrans Channels on Mission Creek.

In order to improve fish passage at the Caltrans Channels, a feasible design had to be developed. Using grant funds from DFG, EDC (through a grant from the Annenberg Foundation), and the Wendy P. McCaw Foundation, various conceptual designs for improving fish passage were developed and tested. A preferred concept design was

chosen after extensive testing was performed using computer and physical flume modeling of the creek channel. A summary of the flume model testing results are described below.

The flume model testing was conducted by Northwest Hydraulic Consultants (NHC). The flume model was used to evaluate 5 conceptual designs with a focus on three primary criteria: flood elevations (channel conveyance capacity), sediment accumulation in the channel, and fish passage conditions (flow velocities and depth). Tests documented the performance of the design alternatives at various flows up to the flood of record (5,120 CFS).

The model testing was performed during 2007 and completed in 2008. The final report was completed in December 2008. The flume model testing results indicated that four of the five conceptual design options were not feasible because they would 1) reduce the capacity of the channel creating flooding risks and/or 2) trap large amounts of sediment.

The fifth concept design to be tested was named "Side Pockets". The flume model testing indicated that the Side Pockets design was feasible and would meet the criteria for flooding, fish passage, and maintenance. The final flume model report provided the following recommendation: "Alternative 5 (Side Pockets) is recommended as a suitable modification for re-establishing steelhead passage through the lower reaches of Mission Creek. Test results indicate that Alternative 5 (Side Pockets) would provide adequate velocity reductions without adversely impacting channel capacity. While some sediment accumulation may occur in the fish way, maintenance is expected to be minor and infrequent."

The flume model testing identified a preferred design (Side Pockets) for improving fish passage at the Caltrans Channel on Mission Creek. After evaluating the report, City staff, FCD, and the resource agencies agreed that Alternative 5 (Side Pockets) was the best design option and that preliminary plans for Alternative 5 (Side Pockets) should be developed to further evaluate the feasibility of the design.

Preliminary and Final Design

In August 2009, the Creeks Division hired HDR Engineering to complete preliminary and final design construction plans and specifications for the Side Pockets design.

The specific "Side Pockets" design as currently proposed includes removal of a portion of the existing channel slab, and construction of a concrete low flow channel 4 feet wide by 2.5 feet deep with resting pockets cut into the walls of the low flow channel. The resting pockets would be 10 feet long, 2.5 feet wide and 2.5 feet deep and would be placed every 40 feet along the low flow channel. One foot high sills (speed bumps) would be placed on the bottom of the low flow channel every 40 feet midway between the resting pockets to increase water depth at low flows.

As part of the preliminary design process, the side pockets design is being evaluated using computer modeling and sediment analysis. The analysis is being performed in order to verify the performance of the Side Pockets design in improving fish passage, maintaining channel capacity, and reducing sediment deposition. The analysis will also provide information for making modifications to improve the design. The preliminary results of the performance analysis indicate that the proposed design meets the criteria but could benefit from some small modifications to the depth of the channel, shape and spacing of the sills, and spacing of the side pockets. The results of the analysis will be presented in a performance design memo. The memo is due to the Creeks Division on February 26th. Along with the design memo, construction plans at 60% detail will also be provided.

Agreement for Use of Flood Control District Property

Although the channel was constructed by Caltrans for expansion of Highway 101, FCD was given ownership and responsibility for maintenance. To date, FCD staff has been supportive of the fish passage project and have been closely involved with project design. In order to construct and maintain the proposed fish passage project on FCD property, the City entered into a formal agreement with the FCD. The agreement defines the rights and responsibilities of the City and the FCD with regard to the fish passage project. The agreement between the City of Santa Barbara and FCD was approved by the City Council in January 2009 and approved by the FCD Board of Directors in April 2009.

Funding

The total cost for completing conceptual design work including the flume model testing was \$213,000. The total estimated cost for completing final design work is \$512,000. Environmental review and permitting is expected to cost \$110,000. The EDC has \$135,000 available from the Annenberg Foundation grant for preliminary design work. The Creeks Division has also received a \$500,000 grant from the Department of Fish and Game to complete preliminary/final design work and project permitting. Currently, adequate grant funds are available to complete the final design, permitting, and environmental review.

Two grant applications for a total of \$2,000,000 in construction funds are pending. Construction will be phased over a two year period (construction can only be conducted during the dry season - summer/fall), with construction of the fish passage improvements at the upper channel during the first year and the lower channel during the second year. If the grant funds are awarded to the Creeks Division, they will be utilized to construct the fish passage improvements on the upper channel. The anticipated Creeks Division capital budget for the Caltrans Channel fish passage project on Mission Creek for Fiscal Year 2011 is \$611,000. The preliminary estimate for construction of the upper channel is approximately \$2.6 million. If the requested grant funds are awarded, adequate funds for project construction will be available for the summer of 2010.

Should the grant application requests for construction of the upper channel be denied, the Creeks Division will apply for additional grant funds in 2010. Grant funds for the construction of the fish passage improvements on the lower channel will also be applied for in 2010. Grant writing will be continued, until adequate funds have been procured to complete construction of both the upper and lower channel. It may require multiple years of grant writing before adequate construction funds are obtained.

Next Steps

The final construction design and specifications are scheduled to be completed in June 2010. California Environmental Quality Act (CEQA) analysis will be initiated in March 2010, once 60% design plans have been received. Permit applications to federal and state regulatory agencies will be submitted in April 2009. It is anticipated that CEQA analysis and permitting will require 3-6 months to complete.

Assuming plans and permitting are complete and pending grant applications are funded, the City will move forward with construction of the upper channel in fall 2010. If grant funds are not provided or permitting is not completed, than construction of the upper channel will be delayed until 2011. Construction of the lower channel will be conducted the summer after construction is completed on the upper channel (either 2011 or 2012); assuming grant funds for construction are available. Lack of grant funds would delay the estimated dates of construction.

Tallant Road and 192 Bridges

Background

In conjunction with the fish passage work on the Caltrans Channels, the Creeks Division has been working to develop design plans for modifying steelhead trout fish migration barriers at the Tallant Road and Highway 192 bridges. Aside from the Caltrans Channels, these two migration barriers are the most severe barriers in the lower to mid Mission Creek watershed. In cooperation with the City of Santa Barbara, the County of Santa Barbara Project Clean Water (using grant funds from the State Coastal Conservancy) hired Questa Engineering to develop conceptual design plans for fish passage projects at the Tallant Road and Highway 192 bridges. The conceptual design work was completed in March 2007.

Tallant Road Bridge: The Tallant Road Bridge is located just upstream of Oak Park and provides a critical link between the Samarkand neighborhood and downtown Santa Barbara. The bridge currently has a large concrete grade control structure that extends downstream of the bridge approximately 80 feet. The grade control structure also protects a sewer line that runs below the creek. At the bottom of the grade control structure is a large pool. Due to the height and length of the grade control structure, fish passage upstream is considered almost impossible.

Highway 192 Bridge: The Highway 192 Bridge is located east of Mission Canyon Road immediately upstream of Rocky Nook Park. The bridge currently has a large concrete grade control structure that extends downstream of the bridge approximately 40 feet.

The grade control structure also protects a large 36" water main (operated by the Cachuma Operation and Maintenance Board) that runs below the creek. At the bottom of the grade control structure is a large pool. Due to the height and length of the grade control structure, fish passage upstream is considered almost impossible.

Conceptual Design

Questa Engineering looked at a number of alternatives to improve fish passage at the Tallant Road and Highway 192 bridges including the option of replacing the bridges. Due to the cost of replacing the bridges and a number of constraints upstream of the bridges (structures built directly on the banks of the creek, private property easement issues, limited equipment access, and high steep eroding banks) it was decided that bridge replacement and bed modification upstream of the bridges would prove too expensive and risky.

The constructed riffle alternative was chosen for both the Tallant Road and the Highway 192 bridges because it would not increase flooding risks and it would maintain the existing pools at the base of the grade control structures (which provide fish habitat that the resource agencies would not allow to be filled). This alternative would also provide fish passage at various flow stages, would have good structural integrity, and was preferred by the permitting agencies and City staff.

The constructed riffle design will replace the existing grade control structures with a series of large riffles and pools. Riffles are defined as areas within a stream channel where water is relatively shallow and moves quickly over rock or gravel bars. The riffles will essentially appear as large rock ramps, with a grade of 3-4%. The riffles (ramps) will contain varied rock sizes from small (6-8 inch cobble) to extra large (4 ton). At the base of each riffle there will be a pool. The pools will provide resting places for fish during upstream migration. The banks of the creek will also contain a mixture of large and small rock to prevent bank erosion and create a stable channel. The key components of the constructed riffle are:

- Saw cut a low flow channel in the concrete below the bridge;
- Remove all of the concrete grade control structures downstream of the bridges;
- Fill a portion of the downstream channels with various rock sizes to construct riffles (rock ramps) with check structures made from very large boulders;
- Create pools below the rock riffles;
- All work would occur within the existing stream channels and would stretch approximately 100 feet (Highway 192) and 300 feet (Tallant Road) downstream of the bridges.

Final Design& Permitting

Tallant Road Bridge: Questa Engineering was hired by the Creeks Division to prepare final construction plans and specifications in July 2008 using DFG grant funds. To date, construction plans at 90% detail and draft construction specifications have been completed. The 90% plans and specifications are currently being reviewed by staff.

The construction plans were not completed as scheduled due to delays in agency review and a major change in the project description, which included removing and relocating a sewer line that currently crosses under the creek bed. The sewer line will now be relocated closer to the bridge where it can be better protected from damage without impacting fish passage.

Permitting for the project is nearly complete. CEQA review was completed in May 2009. Permits from Fish and Game (1601) and Regional Water Quality Control Board (401) have been issued. The Army Corps of Engineers permit (404) has been delayed due to consultation with NOAA, but is now awaiting final administrative approval.

Highway 192 Bridge: Questa Engineering was hired by the Creeks Division to prepare final construction plans and specifications in July 2008. The Creeks Division received a grant from DFG to develop the plans for the fish passage project and was originally going to construct the project. However, COMB has a 36' water line immediately downstream of the Highway 192 Bridge that needs to be replaced. COMB has agreed to use the fish passage plans to restore the creek during the water line replacement project. The Creeks Division is coordinating with COMB on completing the final plans and specifications, but COMB is now the responsible agency for permitting and constructing the fish passage project.

To date, construction plans at 90% detail and construction specifications have been completed. The 90% plans and specifications are currently being revised per NOAA comments.

COMB has applied for all necessary permits and is awaiting permit approval.

Funding

Tallant Road Bridge: The total cost for completing conceptual design work for the Tallant Road Bridge fish passage project was \$50,000 and was funded through a grant from the California Coastal Conservancy.

In July 2008, the City of Santa Barbara was awarded a \$50,000 grant from the DFG Fisheries Restoration Grant Program for completing final design plans and construction specifications and for permitting the project. This task is almost complete and no additional funds are anticipated for project plans or permitting.

In 2009, the Creeks Division received a \$250,000 grant from the NOAA Open Rivers Program for construction of the project. The Creeks Division has also applied for DFG Fisheries Restoration Grant Program funds in the amount of \$397,000 for project construction. Grant award notification will be in March 2010. The anticipated Creeks Division Fiscal Year 2011 budget for the Tallant Road Bridge fish passage and Oak Park restoration project is \$588,000. The majority of these funds are to be used for the larger Oak Park Restoration project, which is still in the planning stages. Approximately \$185,000 will be needed for the fish passage project. The estimated cost for

construction of the fish passage project is \$832,000. If the DFG grant is awarded, adequate funds for project construction will be available for the summer of 2010.

Highway 192 Bridge: The total cost for completing conceptual design work for the Highway 192 Bridge fish passage project was \$50,000 and was funded through a grant from the California Coastal Conservancy.

In July 2008, City of Santa Barbara was awarded a \$69,000 grant from the DFG Fisheries Restoration Grant Program for completing final design plans and construction specifications for the project. These funds were used by the Creeks Division to hire Questa Engineering to complete the plans and specifications.

The fish project at the Highway 192 Bridge is to be constructed by COMB as explained above. The estimated cost of the fish passage project has not been determined. No additional Creeks Division funds will be required for this project as project construction is the responsibility of COMB.

Next Steps

Tallant Road Bridge: The final construction plans and specifications for the Tallant Road Bridge fish passage project will be completed in March 2010. Permitting will also be completed by March 2010.

Project construction is scheduled to begin in August 2010 and be completed in November 2010. Project construction will be delayed until the summer of 2011 if grant funds are not awarded or if it is determined that potential runoff from the burned areas would threaten the project during the winter of 2010/11.

Highway 192 Bridge: COMB was originally scheduled to replace the water line and construct the fish passage project at the Highway 192 Bridge during the summer of 2010. Project construction has been delayed until the summer of 2011 due to budget constraints.

The final construction plans and specifications for the Highway 192 Bridge fish passage project will be completed in March 2010. Over the next year, COMB will complete CEQA review and permitting (Army Corps of Engineers 404 permit, Section 7 consultation, Regional Water Quality Control Board 401 permit, Caltrans encroachment permit, etc.). COMB has stated they intend to complete permitting and secure funding with construction to occur during the summer of 2011.

cc: Cameron Benson, Creeks Restoration/Clean Water Manager
Jill E. Zachary, Assistant Parks and Recreation Director